# AIR FORCE

# QUALIFICATION TRAINING PACKAGE (AFQTP)


**FOR**

## ELECTRICAL POWER PRODUCTION

## (3E0X2)

## MODULE 15

## ELECTRICAL FUNDAMENTALS

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## MODULE 15

## ELECTRICAL FUNDAMENTALS



Career Field Education and Training Plan (CFETP) references from 1 Aug 02 version.

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Supersedes AFQTP 3E0X2-13, 3 Mar 00

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Pages: 26/Distribution F

# AIR FORCE QUALIFICATION TRAINING PACKAGES
## FOR
# ELECTRICAL POWER PRODUCTION

### 3E0X2

## INTRODUCTION

***Before starting this AFQTP,*** refer to and read the "AFQTP Trainer/Trainee Guide."

***AFQTPs are mandatory and must be completed*** to fulfill task knowledge requirements on core and diamond tasks for upgrade training. ***It is important for the trainer and trainee to understand*** that an AFQTP ***does not*** replace hands-on training, nor will completion of an AFQTP meet the requirement for core task certification. AFQTPs will be used in conjunction with applicable technical references and hands-on training.

***AFQTPs and Certification and Testing (CerTest) must be used as minimum upgrade requirements for Diamond tasks***.

## MANDATORY minimum upgrade requirements:

***Core task:***
AFQTP completion
Hands-on certification

***Diamond task:***
AFQTP completion
CerTest completion (80% minimum to pass)

***Note:*** *Trainees will receive hands-on certification training for Diamond Tasks when equipment becomes available either at home station or at a TDY location*.

***Put this package to use.*** Subject matter experts under the direction and guidance of HQ AFCESA/CEOF revised this AFQTP. If you have any recommendations for improving this document, please contact the Career Field Manager at the address below.

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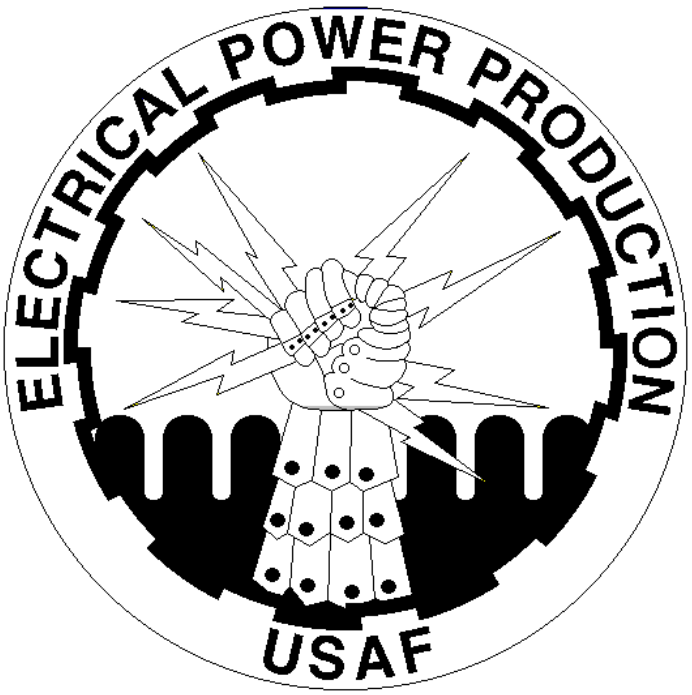
**Notice.** This AFQTP is *NOT* intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.




# ELECTRICAL FUNDAMENTALS

## TEST

## MODULE 15 AFQTP UNIT 9

## DIODES (15.9.1)

**Notice.** This AFQTP is *NOT* intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

# TEST DIODES

## *Task Training Guide*

| | |
|---|---|
| **STS Reference Number/Title:** | 15.9.1., Test Diodes. |
| **Training References:** | 1. 32,33,34, and 35C2 Series Technical Orders (TOs).<br>2. CD-ROM Air Force Qualification Training Package (AFQTP) 3E0X2 Electrical Power Production, Version 1.0, Mar 99: *Test Equipment*.<br>3. Career Development Course (CDC) 3E052A Vol. 2, Electrical Fundamentals and Troubleshooting.<br>4. Manufactures Manuals.<br>5. Air Force Occupational Safety and Health Standard (AFOSHSTD) 91-45, *Hazardous Energy Control and Mishap Prevention Signs and Tags.* |
| **Prerequisites:** | 1. **Possess as a minimum a, 3E032 AFSC.**<br>2. **Review the following references:**<br>2.1. CDC 3E052A Vol. 2.<br>2.2. Applicable T0s and/or Manufacture Manuals.<br>2.3. AFOSHSTD 91-45 for lockout/ tag out procedures.<br>3. **Complete CD-ROM AFQTP 3E0X2 Electrical Power Production, Version 1.0, Mar 99: *Power Production Test Equipment.*** |
| **Equipment/Tools Required:** | 1. Computer to support AFQTP CD ROM.<br>2. Diode.<br>3. Multimeter.<br>4. MEP Generator. |
| **Learning Objective:** | Demonstrate knowledge of diode operation and be able to test diodes using proper test equipment. |
| **Samples of Behavior:** | Trainee will be able to determine if diodes(s) are serviceable using the proper testing equipment. |
| **Notes:** | |
| 1. Prior to performing any maintenance, technician **MUST** isolate the starting system, and apply lockout and tag-out procedures.<br>2. Violation of any safety rule or practice will result in immediate failure.<br>3. The material in this AFQTP was extracted from 35C2 Series TO for the MEP-007B. | |

## TEST DIODES

**1. Background:** A diode is a device designed to permit electron flow in one direction and block flow from the other direction. It consists of two electrodes: a cathode and an anode. A cathode emits electrons and an anode collects the electrons and puts them to use. Diodes are widely used in the Power Production career field in a variety of applications. You will find them in battery chargers, electronic circuit cards and in rotating rectifier assembly, just to name a few. You should be familiar with the construction and applications of a diode to better understand how it works and be able to test it correctly.

**2.** ***Complete the CD-ROM AFQTP 3E0X2 Electrical Power Production, Version 1.0, Mar 99: Power Production Test Equipment. Upon completion of the above-mentioned CD-ROM, properly test a diode using the step-by-step procedures listed below.***

**NOTE:**
The review questions for this material are contained in the above–mentioned CD-ROM.

**NOTE:**
The step has been developed using the MEP-007B as a model. Equipment may vary slightly, but the procedures are basically the same for inspecting/testing diodes.

**SAFETY:**
**PRIOR TO INSPECTING OR TESTING DIODES YOU MUST MAKE SURE THE UNIT WILL NOT START AUTOMATICALLY. YOU MUST ALSO DE-ENERGIZE THE DC CIRCUIT BREAKER AND PLACE THE BATTLE SHORT SWITCH IN THE RAISED POSITION. THESE ACTIONS ARE REQUIRED TO KEEP THE ENGINE FROM STARTING DURING DIODE INSPECTION.**

**3.** ***To perform this task, follow these steps:***

**Step 1: Isolate the engine from starting using lockout/tag out procedures.** Refer to AFOSHSTD 91-45.

**Step 2: Disconnect diode from circuit and test using a multimeter.**

**Step 3: Connect the multimeter across the diode; positive meter lead on the anode (back end of arrow) and negative meter lead on the cathode (tip of the arrow). A low resistance reading should be indicated.**

**NOTE:**
Ensure diode is disconnected from the circuit. Testing a diode in the circuit may produce false readings on the multimeter.

**Step 5: Reverse meter leads; a high resistance reading should be indicated.**

**Step 6: A reading in both directions indicates a shorted diode.**

**TEST DIODES**

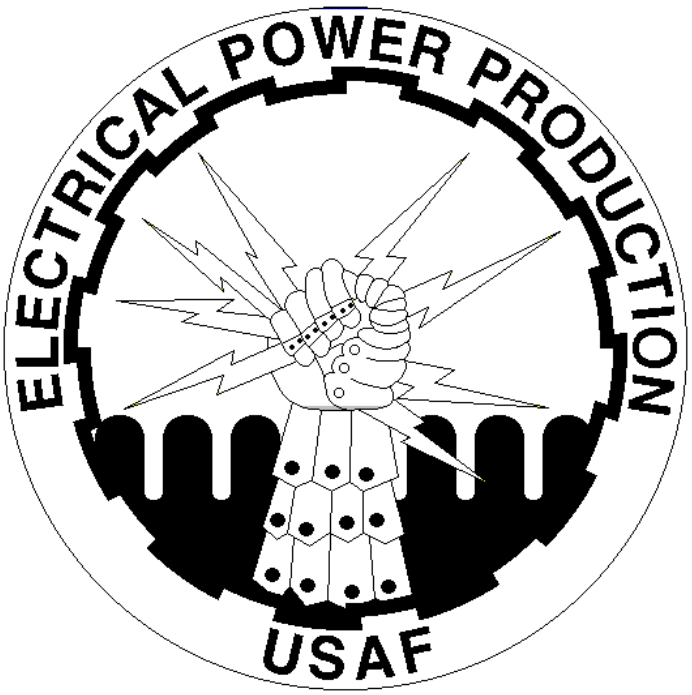
## PERFORMANCE CHECKLIST

## INSTRUCTIONS:

The trainee must satisfactorily perform all parts of the task without assistance. Evaluate the trainee's performance using this checklist.

| DID THE TRAINEE….? | YES | NO |
|---|---|---|
| 1. Review AFQTP Power Production Test Equipment | | |
| 2. Demonstrate knowledge of diode operations | | |
| 3. Perform test on diode using a multimeter | | |
| 4. Practice safety precautions when testing diode | | |
| 5. Review procedures with trainer/certifier | | |
| | | |

**FEEDBACK:** Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.




# ELECTRICAL FUNDAMENTALS

## MODULE 15 AFQTP UNIT 10

## INTERPRET WIRING DIAGRAMS (15.10.)

**Notice.** This AFQTP is *NOT* intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

## INTERPRET WIRING DIAGRAMS

## *Task Training Guide*

| | |
|---|---|
| **STS Reference Number/Title:** | 15.10., Interpret Wiring Diagrams. |
| **Training References:** | 1. Career Development Course (CDC) 3E052A Vol. 2, Electrical Fundamentals and Troubleshooting.<br>2. 35C2-11 Series TO (Section IX). |
| **Prerequisites** | 1. **Possess as a minimum a 3E032 AFSC.**<br>2. **Review the following references:**<br>2.1. CDC 3E052A Vol. 2.<br>2.2. Applicable T0s. |
| **Equipment/Tools Required:** | 1. MEP Generator Series DC Schematic Diagram.<br>2. MEP Generator Series Troubleshooting Diagram. |
| **Learning Objective:** | 1. Read technical data.<br>2. Trace the crank circuit on a DC schematic diagram.<br>3. Extract the crank circuit on the DC Troubleshooting diagram. |
| **Samples of Behavior:** | 1. List components from technical data.<br>2. Trace a circuit on the DC Schematic diagram.<br>3. Trace the circuit on the DC Troubleshooting diagram. |
| **Notes:** | |
| 1. Trainee must read Career Development Course 3E052A, Vol. 2 (Wiring Diagrams) prior to starting this AFQTP.<br>2. The correct circuit must be identified with all components traced on the DC Troubleshooting Diagram to satisfy AFQTP completion.<br>3. The material in this AFQTP was extracted from TO 35C2-3-442-11, Section IX, for the MEP-007B Generator. | |

## INTERPRET WIRING DIAGRAMS

**1. Background:** Wiring diagrams are the roadmaps of electrical equipment. It is imperative in this career field to be proficient in understanding and interpreting wiring diagrams. Wiring diagrams have a three-fold purpose: (1) show system components, (2) allow you to understand system operation, and (3) used in the troubleshooting of electrical components. This AFQTP follows guidelines outlined in Career Development Course 3E052A Volume 2 containing information on Wiring Diagrams.

**2.** ***To perform this task, follow these steps:***

**Step 1: Read Technical Data for Circuit Operation.**

**1.1.** The following is an excerpt from the TO for the MEP-007B start circuit. For our purposes we are only concerned with the crank portion of the crank circuit.

**1.1.1.** When the S2 START-STOP-RUN switch is toggled to the START position, four actions occur.

**1.1.2.** Cranking relay K3 energizes, both engine and day tank solenoids activate.

**1.1.3.** Fuel pumps B2 and B3 start operating.

**1.1.4.** Stop-run relay K1 energizes.

**1.1.5.** When cranking relay K3 energizes, its contacts close and 24 VDC is applied to and activates start solenoid L4 (mounted on starter motor B1). As a result, B1 cranks the diesel engine, turning it over at 300 rpm.

**Step 2: List the Components.**

**2.1.** Go back through the technical data and make a list of all the components mentioned that pertain to the crank circuit.

**2.1.1.** S2 (Start-Stop-Run).

**2.1.2.** K3 (Crank Relay).

**2.1.3.** Batteries (24 Volts dc).

**2.1.4.** L4 (Start solenoid).

**2.1.5.** B1 (Starter).

**2.2.** You can also use what you know about the circuit. For instance, you know that you have to push in the CB1 (DC circuit breaker) to let the generator crank and you have to have the Battle Short switch (S7) in the off position to allow the generator to crank. So, go ahead and add those two items to your list.

**Step 3. Trace the circuit on the DC Schematic Diagram (Figure 1).**

**3.1.** Mark the components on the schematic diagram (pencil to begin with) from the list you made.

**3.2.** Starting with the power source, in this case the positive side of the battery, follow current flow through the shunt resister. The shunt resistor reduces current flow so it can be measured by the ammeter. Continue to the CB1, if the CB1 is closed current will flow to the S2 Start/Stop/Run switch.

**3.3.** By holding the S2 in the start position we allow current flow to continue to the S7 Battle Short switch.

**3.4.** After leaving the S7 current will flow to the normally closed S91 Speed Switch (start disconnect and filed flash).

**3.5.** Current will continue to flow through the CR3 diode until it reaches the positive terminal on the K3 (crank relay) coil.

**3.6.** When the coil of the K3 is energized the contacts of the K3 will close allowing battery power to flow to the positive side of the L1 starter solenoid. This will allow the contacts of the L1 to close.

**3.7.** As the contacts of the L1 close, battery power is applied to the starter motor. The starter will start to rotate.

**NOTE:**
To find out what a component is actually called refer to the Legend on the Diagram to see the name of the component. For example, the legend tells you the K3 is called the Crank Relay.

**Step 4: Trace the Crank Circuit on the Troubleshooting Circuit**

**4.1.** Important to remember: all switches, contacts, relays, and other devices are shown in the "de-energized position on wiring diagrams, unless otherwise specified. Use your DC schematic diagram Figure 1, to trace the crank circuit from the DC troubleshooting (schematic) diagrams in Figures 2, 3, and 4.

**4.2.** Trace in exactly the same order as you did on the schematic diagram.

**4.3.** Mark the components on your troubleshooting diagram.

**4.4.** Trace the circuit on the DC Troubleshooting diagram Figures 2,3, and 4 from the schematic diagram. (You have to put these diagrams together in order to trace the circuit.)

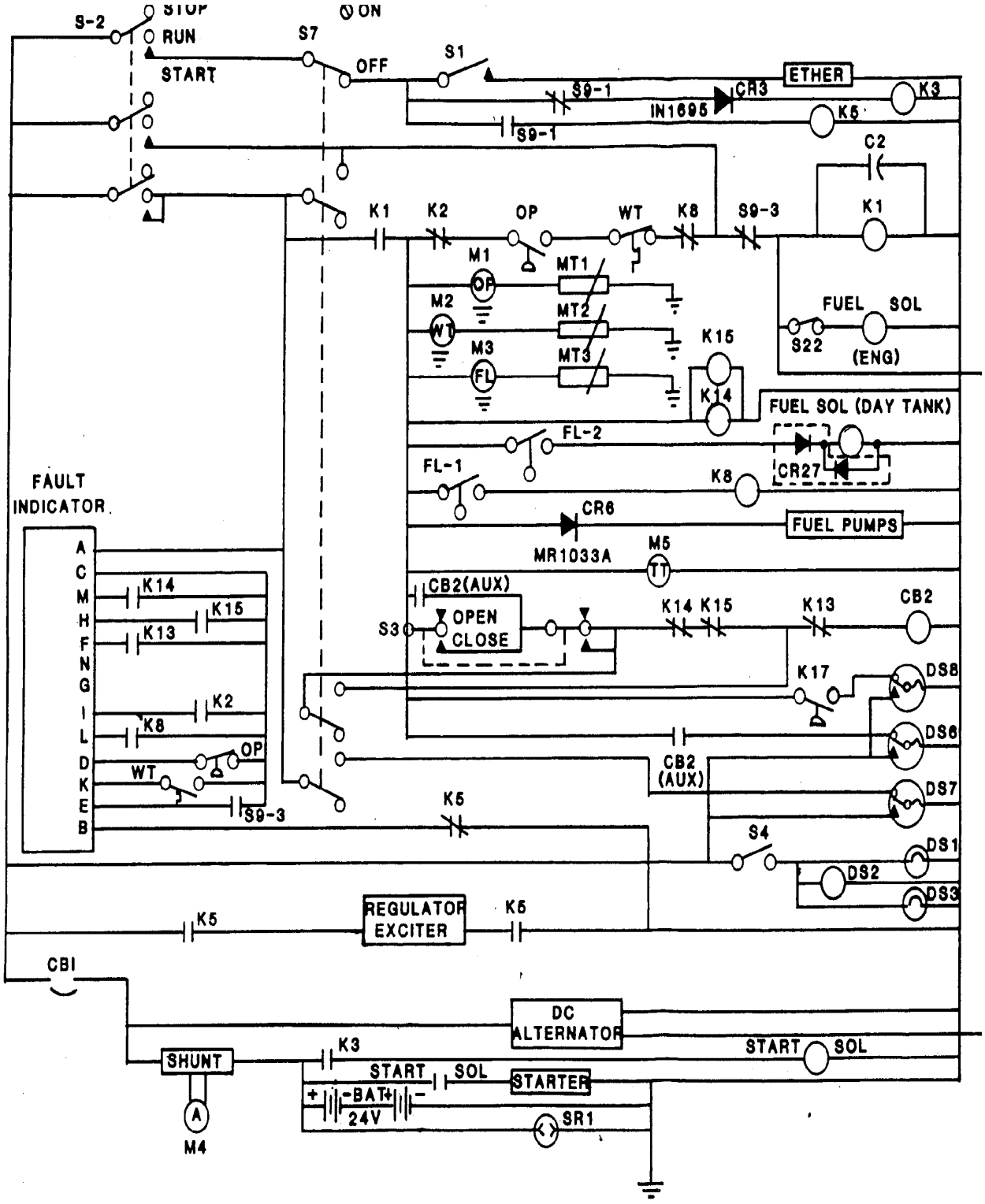
**4.5.** Now that you have traced the circuit, you can extract the circuit.

**Step 5: Extract the Crank Circuit.**

**5.1.** For our purposes, trainee will refer to Tracing and Extracting circuits from CDC 3E052A, Vol. 2.

**5.2.** Circuit extraction makes it easier for you to troubleshoot and identify circuit operation. The following steps are guidelines in extracting circuits:

**5.2.1.** Begin with unit of highest resistance. For example in the crank circuit, the starter would be unit of highest resistance. If you were extracting the panel light circuit, the lights would be unit of highest resistance.
**5.2.2.** Identify and label all circuit components, conductors, wire numbers, print strips, contacts (i.e., normally open or normally closed), and cannon plugs. In this step, be sure to identify all points.
**5.2.3.** Set all switches to the desired position and close the appropriate contacts of all relays. If a switch or relay coil is energized, remember to close or open appropriates contacts.
**5.2.4.** Meter circuits have more than one path; you may have to trace all paths for your component.
**5.2.5.** When your trace passes through a device or terminal board where a choice of numbers exists, normally the lowest progression letter is the correct one to choose.




DC Schematic Diagram

**Figure 1. DC Schematic Diagram**

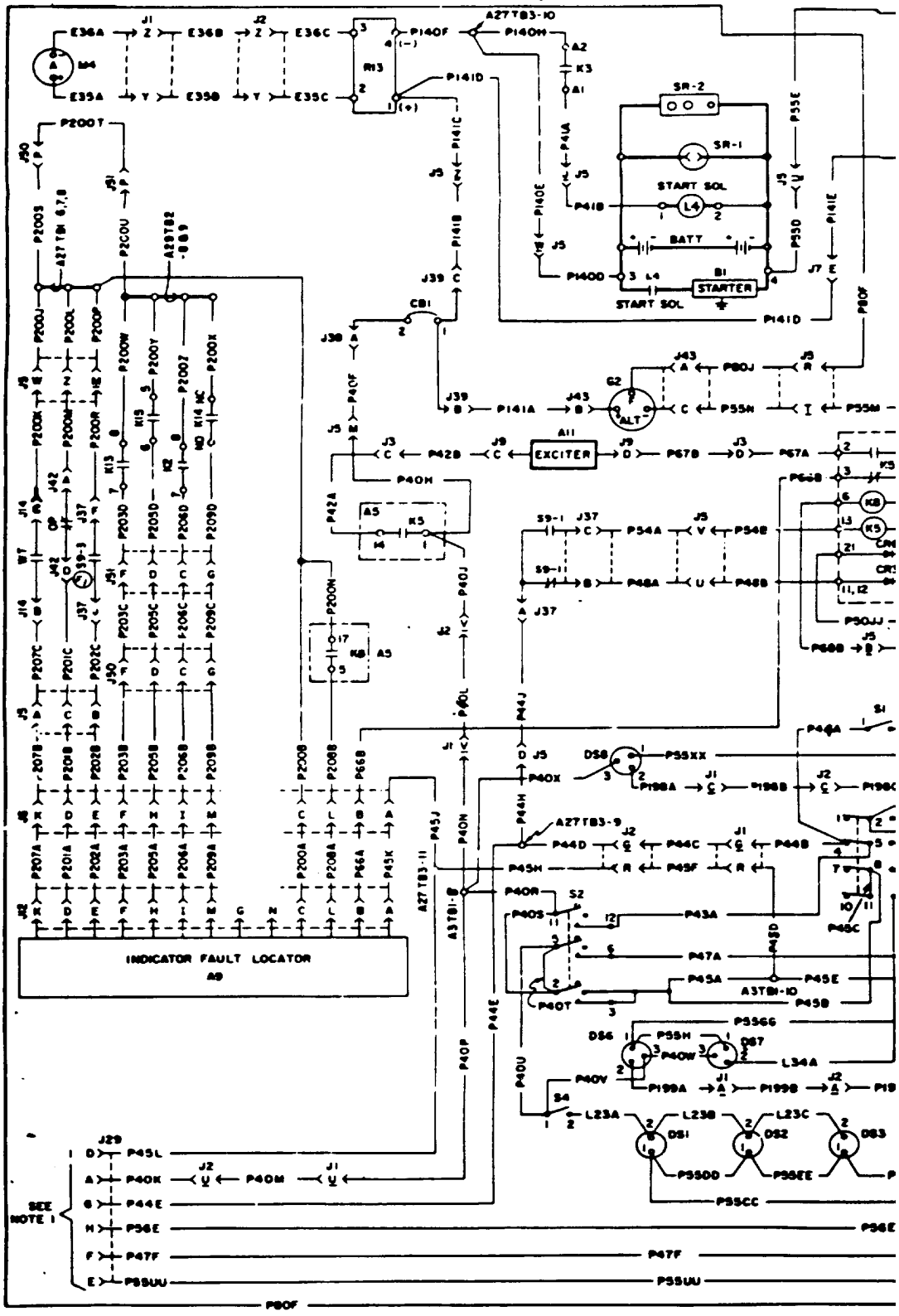



**Figure 2. DC Troubleshooting Diagram.**

**Notice.** This AFQTP is *NOT* intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

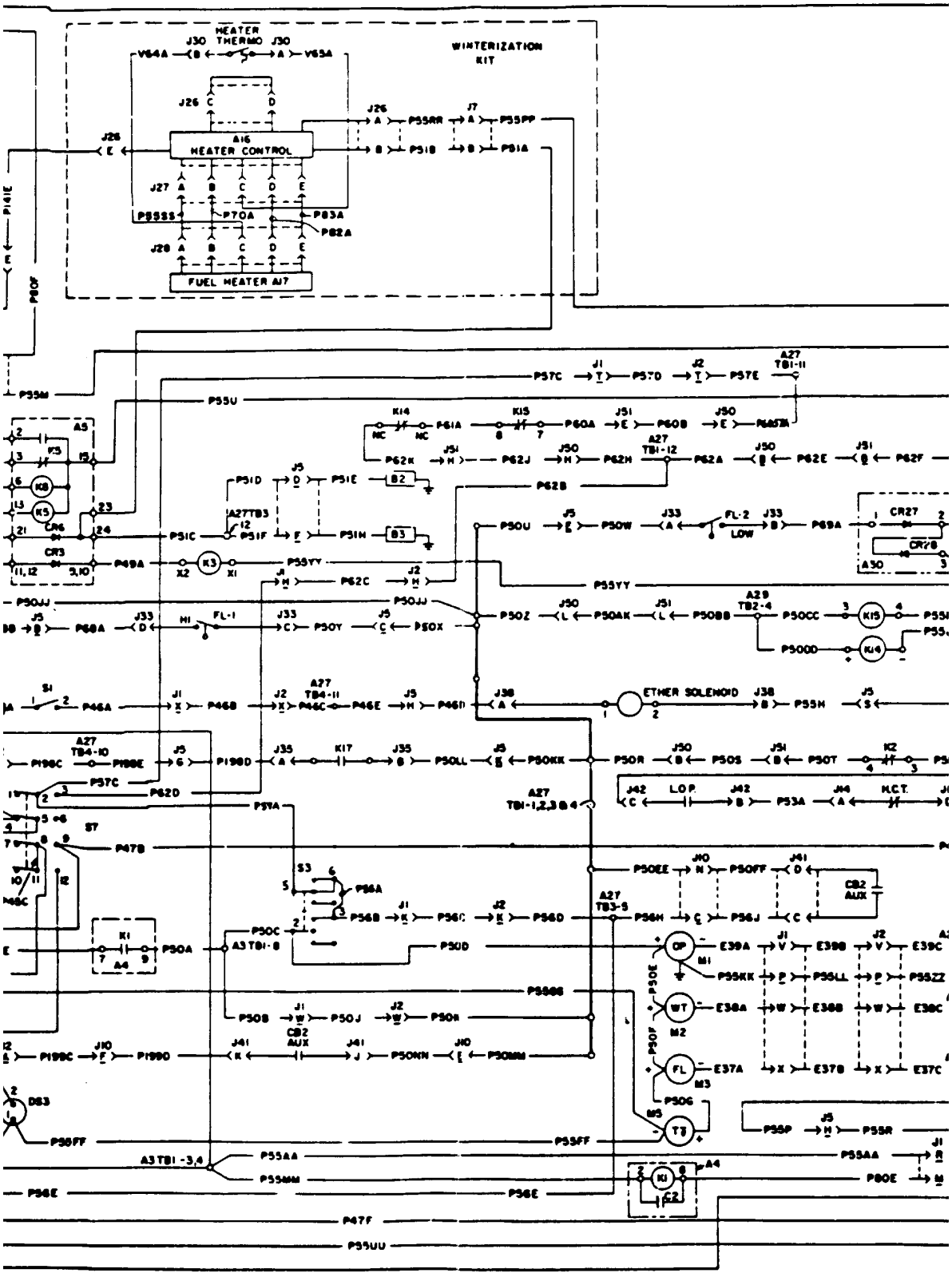



**Figure 3. DC Troubleshooting Diagram.**

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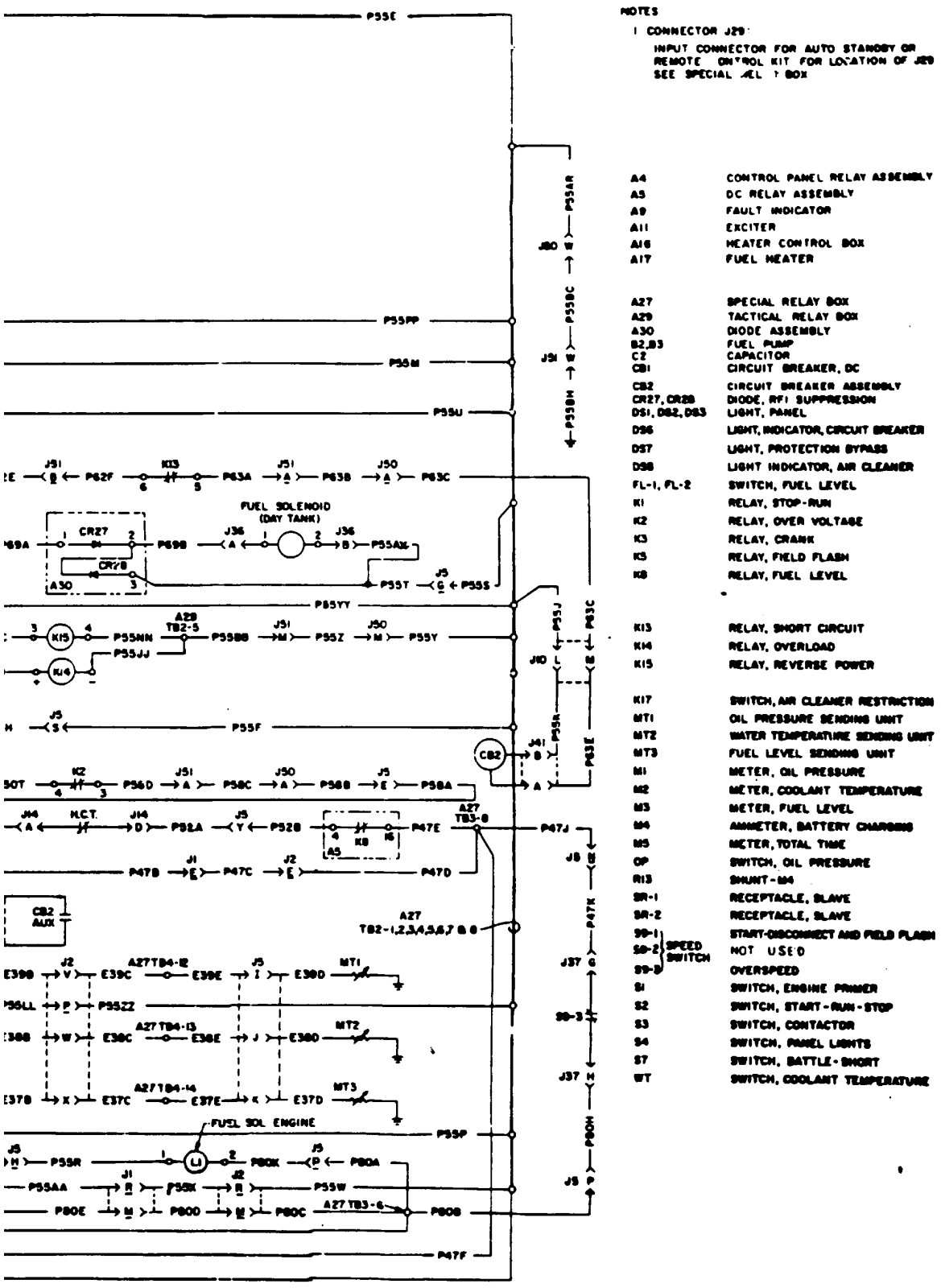


**Figure 4. DC Troubleshooting Diagram.**

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## REVIEW QUESTIONS
## FOR
## INTERPRETING WIRING DIAGRAMS

| QUESTION | ANSWER |
|---|---|
| 1. Which diagram shows the simplified circuit? | a. Schematic.<br>b. Troubleshooting.<br>c. One line.<br>d. Connections. |
| 2. Which diagram shows wire numbers? | a. Schematic.<br>b. Troubleshooting.<br>c. One-line.<br>d. Connection. |
| 3. Which way does electricity travel? | a. North to South.<br>b. South to North.<br>c. Positive to Negative.<br>d. Negative to Positive. |
| 4. What is the first step in interpreting a circuit? | a. Trace schematic diagram.<br>b. Trace troubleshooting diagram.<br>c. Read technical data.<br>d. Extract circuit. |
| 5. What circuit breaker is a component of the crank circuit? | a. CB1.<br>b. CB2.<br>c. CB3.<br>d. CB4. |
| 6. What does S symbolize? | a. Coil.<br>b. Contacts.<br>c. Lights.<br>d. Switch. |
| 7. What does K symbolize? | a. Coil.<br>b. Relay.<br>c. Contacts.<br>d. Switch. |
| 8. The components on the troubleshooting diagram are traced in reverse of the schematic diagram? | a. True.<br>b. False. |
| 9. What does a P55 wire on a MEP Generator indicate? | a. Hot wire.<br>b. Cold wire.<br>c. Neutral wire.<br>d. Ground wire. |
| 10. Begin with unit of highest resistance when extracting a circuit | a. True.<br>b. False. |

## INTERPRET WIRING DIAGRAMS

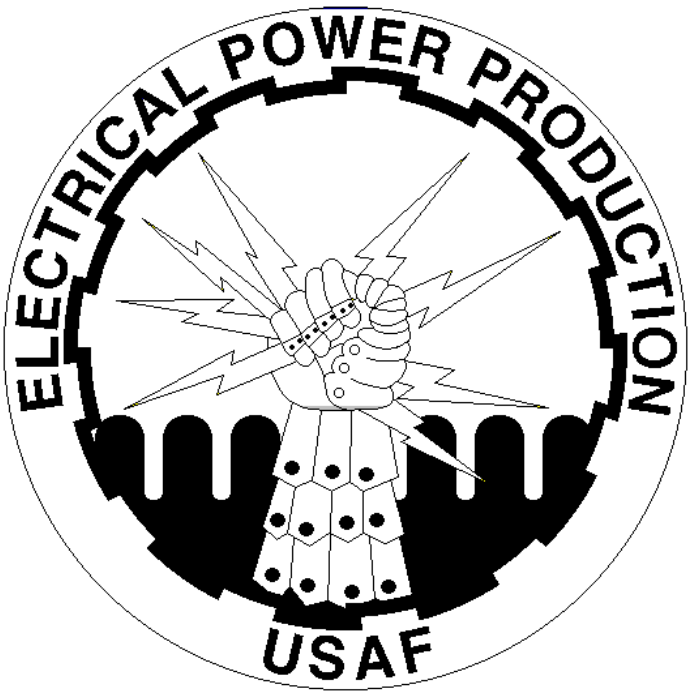
## PERFORMANCE CHECKLIST

**INSTRUCTIONS:**

The trainee must satisfactorily perform all parts of the task without assistance. Evaluate the trainee's performance using this checklist.

| DID THE TRAINEE….? | YES | NO |
|---|---|---|
| 1. Review CDC 3E052A Vol. 2, Unit 4 | | |
| 2. Demonstrate knowledge of wiring diagrams | | |
| 3. Trace and extract circuits | | |
| 4. Complete test | | |
| 5. Review procedures with trainer/certifier | | |
| | | |

**FEEDBACK:** Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.




# ELECTRICAL FUNDAMENTAL

## MODULE 15 AFQTP UNIT 11

## TROUBLESHOOT ELECTRICAL CIRCUITS (15.11.)

**Notice.** This AFQTP is *NOT* intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

# TROUBLESHOOT ELECTRICAL CIRCUITS

## *Task Training Guide*

| | |
|---|---|
| **STS Reference Number/Title:** | 15.11., Troubleshoot electrical circuits. |
| **Training References:** | 1. Career Development Course (CDC) 3E052A, Vol. 2, Electrical Fundamentals and Troubleshooting.<br>2. 35C2 Series Technical Orders (TOs).<br>3. CD-ROM Air Force Qualification Training Package (AFQTP) 3E0X2 Electrical Power Production, Version 1.0, Mar 00: *Engine Start Systems.*<br>4. Air Force Occupational Safety and Health Standard (AFOSHSTD) 91-45, *Hazardous Energy Control and Mishap Prevention Signs and Tags.* |
| **Prerequisites** | 1. **Possess as a minimum a 3E052 AFSC.**<br>2. **Review the following references:**<br>2.1. CDC 3E052A Vol. 2.<br>2.2. Applicable T0s and/or Manufacture Manuals.<br>2.3. AFOSHSTD 91-45 for lockout/ tag out procedures.<br>3. **Complete CD-ROM AFQTP 3E0X2 Electrical Power Production, Version 1.0, Mar 00: *Engine Start Systems.*** |
| **Equipment/Tools Required:** | 1. Computer to support CD-ROM AFQTP.<br>2. AFQTP Engine Start Systems.<br>3. MEP Generator Series DC Schematic Diagram.<br>4. MEP Generator Series Troubleshooting Diagram. |
| **Learning Objective:** | Troubleshoot electrical circuits |
| **Samples of Behavior:** | 1. Trainee will be able to troubleshoot electrical circuit<br>2. Trainee will be able to trace start circuit using DC schematic |
| **Notes:** | |
| Trainee must read Career Development Course 3E052A, Vol. 2 (4-2, Troubleshooting Procedures) and AFQTP Engine Start Systems prior to starting this AFQTP. | |

# TROUBLESHOOT ELECTRICAL CIRCUITS

**1. Background:** Troubleshooting electrical circuits is a procedure that takes knowledge of how the circuit operates. The effectiveness of troubleshooting depends on how much one knows about the equipment and how much thinking is done while performing the work. Remember to keep it simple! One can create more troubleshooting than necessary by getting caught up in the process and over looking the obvious. Ask yourself three important questions.

**1.1.** What was the warning signs preceding the trouble?

**1.2.** What recent repairs have been done?

**1.3.** Has a similar trouble occurred before?

**2.** ***Complete the CD-ROM AFQTP 3E0X2 Electrical Power Production, Version 1.0, Mar 00: Engine Start Systems. Upon completion of the above-mentioned CD-ROM and the following information properly troubleshoot a start circuit using the step-by-step procedures listed below.***

**NOTE TO TRAINER:**
This AFQTP follows guidelines for MEP-7B crank circuit, the fundamental steps in troubleshooting are the same for any item, but circuit operation may differ. Make sure trainee has a clear understanding of your equipment and give them a scenario if different from what is identified in this AFQTP.

**3. START CIRCUIT OPERATION FOR MEP-7B.** When the Start-Stop switch is toggled (held in the up position) to the start position, positive voltage flows through the Shunt Resistor R13, DC Control Circuit Breaker CB1, Start-Stop switch S2, Battle Short Switch S7, Speed Switch S9-1, and CR3 to the coil of the Cranking Relay K3. Once K3 energizes, its normally open contacts close, allowing 24 VDC to be applied to the Start Solenoid L4. When L4 energizes, it closes its normally open contacts and applies 24 VDC to start the Motor B1. The engine will crank. (Follow steps with Fig. 1 in the AFQTP.)

**4. SAFETY CIRCUIT OPERATION.** The safety circuit incorporates devices to protect the engine in the event of a problem. We will only cover a few to help better understand key elements the start circuit.

**4.1. Low Oil Pressure:** The oil pressure switch closes at 30 psi. If lubricating oil pressure falls below, 15 +/-3 psi, the contacts of oil pressure switch OP open and remove power from fuel solenoid L1, thereby shutting down the engine.

**4.2. High Coolant Temperature:** If the coolant temperature rises above 222 +/-3 degrees, engine damage may occur. Water temperature switch mounted in the engine block, senses coolant temperature, and opens when temperature becomes excessive. Connected in series with L1, this switch deactivates the fuel solenoid when it opens, causing the unit to shut down.

**4.3. Over Speed:** If engine speed increases to a point where damage may occur, over speed switch S9-3 (set to operate at approximately 2450 rpm) opens, deactivating fuel shutdown solenoid L1 by removing 24 VDC from the solenoid.

**5.** ***To perform troubleshooting of electrical circuit, follow these steps:***

**Step 1: Perform an operational check.**

**1.1.** The first step is to perform an operational check of the generator to determine if an actual problem really exists. Follow step-by-step procedures in the technical manual for your particular item of equipment. Perform a visual inspection of the electrical components, check wiring harness for breaks, check transformer, resistors, relays for loose connections, evidence of over heating, cracks or any signs of damage.

**Step 2: Analyze the malfunction:**

**2.1.** The second step in troubleshooting is to analyze the malfunction. Once you are aware of a malfunction, consult the proper technical manual for normal circuit operation. This gives one a clearer understanding of how the circuit should be working. One can also use the troubleshooting chart located in the proper technical manual.

**2.2.** It is in this step that one determines the type of trouble in order to determine the type of test equipment to use.

**Step 3: Locate the malfunction.**

**3.1.** Locating the malfunction is perhaps the most difficult task. In this step, one will need to stay focused on the problem and not allow frustration to set in. This can cause one to resort back to the remove and replace technique. Perform the previous steps, determine type of meter to use and extract the circuit. Understanding circuit operation and knowing the “how, what, when and where” in circuit operation is key to locating the malfunction.

**Step 4: Perform corrective action.**

**4.1.** Once you have located the problem, a neat and permanent repair is a necessity. Use original replacement parts to make repairs.

**Step 5: Perform an operational check.**

**5.1.** This is the final step and most rewarding in the troubleshooting process. If you do not prove your work, you will not know if the problem is solved. One malfunction can produce more than one problem.

## REVIEW QUESTIONS
## FOR
## TROUBLESHOOT ELECTRICAL CIRCUITS

| QUESTION | ANSWER |
|---|---|
| 1. Which troubleshooting procedure uses sight, sound, and smell? | a. Perform an operational check.<br>b. Analyze the malfunction.<br>c. Locate the malfunction.<br>d. Perform corrective action. |
| 2. What fundamental step in troubleshooting is the most difficult? | a. Perform an operational check.<br>b. Analyze the malfunction.<br>c. Locate the malfunction.<br>d. Perform corrective action. |
| 3. What step in troubleshooting requires a permanent fix? | a. Perform an operational check.<br>b. Analyze the malfunction.<br>c. Locate the malfunction.<br>d. Perform corrective action. |
| 4. What is the first step in troubleshooting? | a. Perform an operational check.<br>b. Analyze the malfunction.<br>c. Locate the malfunction.<br>d. Perform corrective action. |
| 5. The over speed switch S9-3 open at what RPM? | a. 1000 RPM.<br>b. 1500 RPM.<br>c. 2000 RPM.<br>d. 2450 RPM. |
| 6. What oil pressure is required for the oil pressure switch to close? | a. 10 psi.<br>b. 25 psi.<br>c. 30 psi.<br>d. 15 psi. |

## TROUBLE SHOOT ELECTRICAL CIRCUITS

## PERFORMANCE CHECKLIST

**INSTRUCTIONS:**

The trainee must satisfactorily perform all parts of the task without assistance. Evaluate the trainee's performance using this checklist.

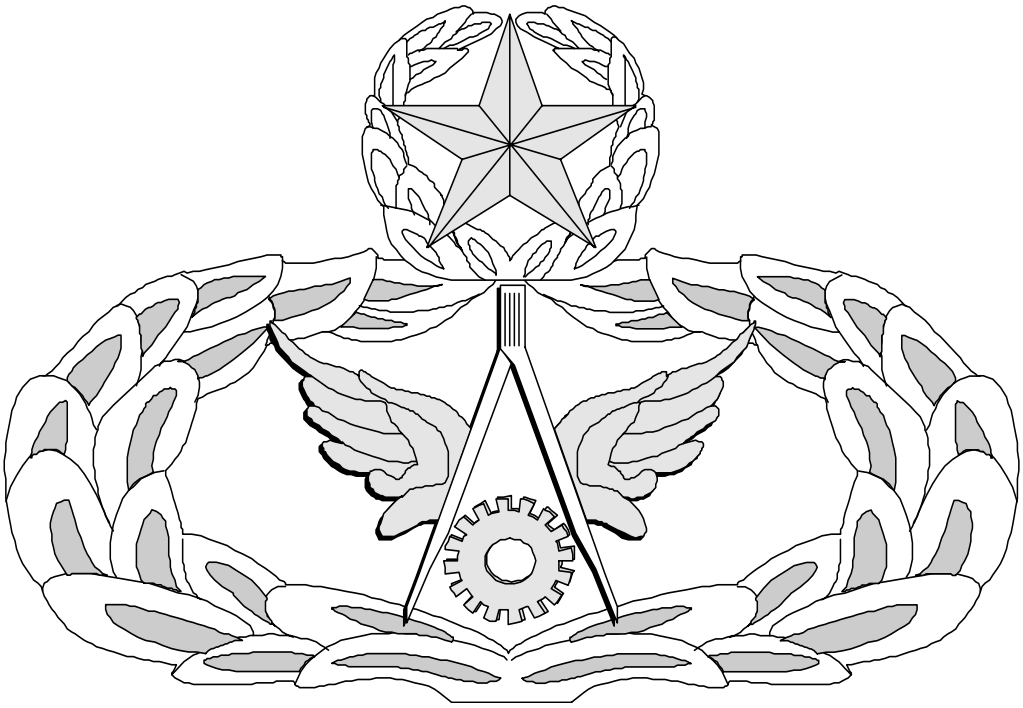
| DID THE TRAINEE….? | YES | NO |
|---|---|---|
| 1. Have the proper equipment and scenario to perform task | | |
| 2. Perform an operational check | | |
| 3. Analyze the malfunction | | |
| 4. Locate the malfunction | | |
| 5. Perform corrective action | | |
| 6. Perform an operational check | | |

**FEEDBACK:** Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

# Air Force Civil Engineer

## QUALIFICATION TRAINING PACKAGE (QTP)

## REVIEW ANSWER KEY



**FOR**

**ELECTRICAL POWER PRODUCTION**

**(3E0X2)**

## MODULE 15

## GENERAL POWER PRODUCTION TASKS

**Notice.** This AFQTP is *NOT* intended to replace the applicable technical references nor is it intended to replace hands-on training. It is to be used in conjunction with these for training purposes only.

## INTERPRET WIRING DIAGRAMS
**(3E0X2-15.10)**

| QUESTION | ANSWER |
|---|---|
| 1. Which diagram shows the simplified circuit? | b. Troubleshooting |
| 2. Which diagram shows wire numbers? | b. Troubleshooting |
| 3. Which way does electricity travel? | d. Negative to Positive |
| 4. What is the first step in interpreting a circuit? | a. Trace schematic diagram |
| 5. What circuit breaker is a component of the crank circuit? | a. CB1 |
| 6. What does S symbolize? | d. Switch |
| 7. What does K symbolize? | b. Relay |
| 8. The components on the troubleshooting diagram are traced in reverse of the schematic diagram? | a. True |
| 9. What does a P55 wire on a MEP Generator indicate? | d. Ground wire |
| 10. Begin with unit of highest resistance when extracting a circuit. | a. True |

## TROUBLESHOOT ELECTRICAL CIRCUITS
**(3E0X2-15.11)**

| QUESTION | ANSWER |
|---|---|
| 1. Which troubleshooting process uses sight, sound, and smell? | b. Analyze the malfunction |
| 2. What fundamental step in troubleshooting is the most difficult? | c. Locate the malfunction |
| 3. What step in troubleshooting requires a permanent fix? | d. Perform corrective action |
| 4. What is the first step in troubleshooting? | a. Perform an operational check |
| 5. The over speed switch S9-3 open at what RPM? | d. 2450 RPM |
| 6. What oil pressure is required for the oil pressure switch to close? | c. 30 psi |

MEMORANDUM FOR HQ AFCESA/CEOF
139 Barnes Drive Suite 1
Tyndall AFB, FL 32403-5319

FROM:

SUBJECT: Qualification Training Package Improvement

1. Identify module.

   Module # and title_____

2. Identify improvement/correction section(s):

   _____ STS Task Reference
   _____ Training Reference
   _____ Evaluation Instructions
   _____ Performance Resources
   _____ Steps in Task Performance
   _____ Performance Checklist
   _____ Feedback
   _____ Format
   _____ Other

3. Recommended changes--use a continuation sheet if necessary.

   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____

4. You may choose to call in your recommendations to DSN 523-6392 or FAX DSN/Commercial 523-6488 or (850) 283-6488 or email ceof.helpdesk@tyndall.af.mil.

5. Thank you for your time and interest.

YOUR NAME, RANK, USAF
Title/Position